The Big-Eared Bats of Stanton's Cave

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Stanton's Cave in Grand Canyon National Park once housed the largest colony of maternal Townsend's big-eared bats (*Corynorhinus townsendii*) in the entire United States. Only five maternity roosts of this species have ever been reported in Arizona.

Nursery roosts are critical habitat to bats, particularly to those species that live in colonies. Females will gather from a large geographical area to raise their young in one single maternity roost. For possibly hundreds of years these bats utilized Stanton's Cave in Grand Canyon National Park as one such roost site.

Stanton's Cave lies at 31.7 miles below Lee's Ferry on the Colorado River at an elevation of 927 meters. Although vegetation is sparse and wildlife is not abundant, bats, squirrels and the occasional bighorn sheep can be observed.

The cave has been host to a plethora of archeological specimens and Pleistocene fauna. Bat bones that were discovered in the cave by Euler in 1978, were carbon dated at 6,000 years old. The scientific importance of this cave now reaches into the present day by providing habitat for this big-eared species of bat.

In the early 1970's, Ruffner and Carothers (1974) reported several hundred Townsend's big-eared bats roosting in the cave in early September. Later in that decade, a rapid decline of in the number of roosting bats was documented. A series of events that first began in the late 60's and 70's led to the eventual demise of this highly sensitive bat population. The initial decline likely happened during extensive archeological excavation by Robert Eular et al. during the summer season of 1969 and 1970. At that time, little was known about the maternity colony during the peak summer months and the constant noise, digging and cave occupation by the crew almost certainly caused the bats to flee with little or no reproduction during those years.

Following the completion of the excavation, a chain link fence was constructed to prohibit the looting of sensitive archeological and paleontological resources that remained in the cave. Although the repeated disturbance during excavation may have initiated the bats to flee from the cave, this gate prevented them from returning. By 1986, there was no sign of *C. townsendii* in the cave.

In 1997, the park along with partners in U.S. Fish and Wildlife Service and Bat Conservation International, constructed a bat gate that would prevent human disturbance in the cave but yet allow for pregnant and juvenile bats to exit and enter the cave at will. By the summer of 1998, the big-eared bats had returned-not in large numbers (only five individuals)-but a significant first step. Monitoring efforts in 1999 through 2000 showed an increase to 30 bats-likely females and likely using the cave as a maternity roost.

During a 2001 exit count survey (bats are counted as they exit the cave in the evening hours), zero bats were observed. Biologists found this alarming as the population was just starting to show signs of improvement. The following morning two park biologists entered the cave to find only old guano and no recent signs of bat activity. Looking for signs of disturbance, they quickly found what they believed to be the cause of disturbance to the bats and the reason that the cave was not being utilized as a maternity roost this year. A visitor to the cave-perhaps disgruntled that this area was now closed off to visitation-threw several handfuls of firecrackers through the gate and well within the cave. This one time disturbance alone would be enough for the bats to flee, disrupt reproduction efforts, and not return.

The focus of this year's Grand Canyon National Park Foundation-funded river trip (April 2003) once again had a strong emphasis on bat monitoring. Armed with new technology in the form of an Anabat Detection System (a microphone that receives bat vocalizations and echolocations then transfers the recordings into decibels audible to the human ear) and infrared lights and recording equipment, biologists were determined to detect any sign that Townsend's big-eared bats were recolonizing the cave.

The first evening, biologists sat perched upon a rock outcropping just outside of the cave as bats emerged to forage for the evening. According to the Anabat Detector, Townsend's big-eared bats were indeed present! The following morning, three biologists entered the cave to count bats and determine if the cave was once again host to a maternity colony.

Wildlife Biologist Dr. Bert Frost carefully catches a group of bats within a net as he clings to the wall in the big room of Stanton's Cave.

Ten bats in all were caught that day in Stanton's Cave-all females and all lactating. However, a total of 50 bats were meticulously counted on the cave walls-likely all females and likely nursing.

Biologists are confident that the big-eared bats have returned and are utilizing the cave as a maternity roost. Continued monitoring efforts will be conducted in the hopes of eventually detecting full restoration of the colony to its historical numbers in the hundreds.

Each bat caught was weighed; foot, wing and tragus measurements recorded, and a hair sample pulled for baseline DNA analysis prior to a gentle release.

Dr. Larry Stevens weighs a lactating female bat